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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,776	06/28/2006	Teruaki Yamamoto	043890-0798	4941
20277 7590 12/22/2011 MCDERMOTT WILL & EMERY LLP 600 13TH STREET, N.W. WASHINGTON, DC 20005-3096				
EXAMINER ARCTERO, ADAM A				
ART UNIT 1727		PAPER NUMBER		
NOTIFICATION DATE 12/22/2011		DELIVERY MODE ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mweipdocket@mwe.com

**Office Action Summary****Application No.**

10/584,776

**Applicant(s)**

YAMAMOTO ET AL.

**Examiner**

ADAM A. ARCIERO

**Art Unit**

1727

**Period for Reply** -- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 September 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 5) ☒ Claim(s) 1-11 is/are pending in the application.
- 5a) Of the above claim(s) 8-10 is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 1-7 and 11 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-850)  
Paper No(s)/Mail Date \_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

**NEGATIVE ELECTRODE MATERIAL FOR LITHIUM SECONDARY BATTERY,  
NEGATIVE ELECTRODE USING THE MATERIAL, LITHIUM SECONDARY  
BATTERY USING THE NEGATIVE ELECTRODE, AND MANUFACTURING  
METHOD OF NEGATIVE ELECTRODE MATERIAL**

Examiner: Adam Arciero      S.N. 10/584,776      Art Unit 1727      December 16, 2011

**DETAILED ACTION**

1. The Applicant's amendments filed on September 01, 2011 was received. Claims 1-11 are currently pending. Claims 8-11 remain withdrawn from consideration. Claims 1, 6 and 8 have been amended. Claim 12 has been canceled.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Claim Rejections - 35 USC § 103***

3. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Shimamura et al., Nakamoto et al. and Kawakami et al. on claims 1-7 and 11-12 are maintained.
4. Claims 1-7 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimamura et al. (WO/03/079469 using US 2005/0287439 A1 as English equivalent) in view of Nakamoto et al. (machine translation for JP 2000-173612) and Kawakami et al. (US 6,730,434 B1).

As to Claims 1, 3 and 6-7, Shimamura et al. discloses a negative electrode having a negative electrode material for a lithium secondary battery (claims 6-7) which is capable of

storing and emitting lithium ions (pg. 3, [0038]). Said electrode material comprises a composite particle including a solid phase A which consists of silicon and a mixed phase B which consists of a transition metal element and silicon (intermetallic compound) (pg. 3, [0038]). Shimamura et al. further discloses wherein the mixed phase is microcrystalline (pg. 3, [0025]). Shimamura et al. does not specifically disclose a carbon material adhered to a part of the surface of the basic material particle and a film having a silicon oxide formed on a surface portion of the base material particle and not on the carbon.

However, Nakamoto et al. discloses that fibrous carbon is fixed over a part of the surface of a negative electrode material comprising a Si composite (paragraph [0016]). At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the electrode material of Shimamura et al. by fixing fibrous carbon (claim 3) to the composite particle, because Nakamoto et al. teaches that even if the particle is expanding and contracting with the occlusion and discharge of lithium, the contact state of each particle and the carbon conducting agent is well maintained, and charge/discharge cycle life is increased (paragraph [0016]). Nakamoto et al. and Shimamura et al. do not specifically disclose wherein the basic material particle and silicon oxide film are formed in an inert atmosphere that is free of nitrogen.

However, Kawakami et al. teaches of an anode material comprising silicon which is preferably prepared and mechanically grinded in an inert atmosphere such as argon (col. 12, lines 21-30). When the inert atmosphere comprises only argon, said atmosphere is free of nitrogen. At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the process of Shimamura et al. by forming the basic material particle (mechanical milling/grinding) in an argon gas atmosphere, because Kawakami et al. teaches that it is

important to control the oxygen content of the thin oxide coat (silicon oxide) located on the surface of the particle (col. 17, lines 44-54). Furthermore, one of ordinary skill in the art would have found it obvious to try an inert atmosphere of argon because the Board has stated that “when there is motivation to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.” See MPEP 2141, KSR. Furthermore, it is the position of the Examiner that the properties of having a silicon oxide film formed on an exposed surface portion of the composite base material particle is inherent, given that the materials and methods for producing the negative electrode material of the prior arts and that of the present application are the same. A reference which is silent about a claimed invention’s features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. *In re Robertson*, 49 USPQ2d 1949 (1999).

As to Claim 2, Nakamoto et al. teaches of using a conductive agent such as graphite and carbon fibers (pg. 5, [0061]). Nakamoto et al. is clearly teaching that graphite and carbon fibers are considered functionally equivalent for use as conductive agents in negative electrode materials. Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to substitute the graphite of Nakamoto et al. for the fibrous carbon of Shimamura et al., because Nakamoto et al. teaches that they are recognized equivalents.

As to Claim 4, Shimamura et al. and Nakamoto et al. do not specifically disclose the amount of oxygen per silicon. However, Kawakami et al. teaches of an anode material

comprising silicon which is preferably prepared and mechanically grinded in an inert atmosphere such as argon (col. 12, lines 21-30). Kawakami et al. further discloses wherein the oxygen amount is preferred to be contained in an amount of 0.1% to 3% by weight (col. 17, lines 10-33). This range overlaps the claimed range. The courts have held that where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

As to Claim 5, Shimamura et al. discloses wherein the amount of carbon material is 1 wt% or more and 10 wt% or less (paragraph [0018]).

As to Claim 11, Shimamura et al. and Nakamoto et al. do not specifically disclose wherein the inert gas is argon.

However, Kawakami et al. teaches of an anode material comprising silicon which is preferably prepared and mechanically grinded in an inert atmosphere such as argon (col. 12, lines 21-30). When the inert atmosphere comprises only argon, said atmosphere is free of nitrogen. At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the process of Shimamura et al. by forming the basic material particle (mechanical milling/grinding) in an argon gas atmosphere, because Kawakami et al. teaches that it is important to control the oxygen content of the thin oxide coat located on the surface of the particle (col. 17, lines 44-54). Furthermore, one of ordinary skill in the art would have found it obvious to try an inert atmosphere of argon because the Board has stated that “when there is motivation to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to anticipated success, it is likely the product not of innovation but of

ordinary skill and common sense.” See MPEP 2141, KSR.

***Response to Arguments***

5. Applicant's arguments filed September 01, 2011 have been fully considered but they are not persuasive.

*Applicant's principle arguments are:*

*a) Kawakami allows the use of nitrogen gas as the inert atmosphere, therefore Kawakami fails to teach an inert atmosphere that is free of nitrogen (claim 1).*

In response to Applicant's arguments, please consider the following comments:

a) Kawakami et al. teaches of an anode material comprising silicon which is preferably prepared and mechanically grinded in an inert atmosphere such as argon or nitrogen (col. 12, lines 21-30). Therefore, Kawakami is teaching of alternatives for the inert gas wherein either an argon gas atmosphere (free of nitrogen) or a nitrogen gas atmosphere (free of argon) can be used. It would be obvious to one of ordinary skill in the art to use an inert gas atmosphere comprising only argon gas wherein no nitrogen is present.

***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADAM A. ARCIERO whose telephone number is (571)270-5116. The examiner can normally be reached on Monday to Friday 7am to 4pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barbara Gilliam can be reached on 571-272-1330. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ADAM A ARCIERO/  
Examiner, Art Unit 1727



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/Barbara L. Gilliam/

Supervisory Patent Examiner, Art Unit 1727